CA

2

Modification of catalysts for complete oxidation. I. L. Ya. Margolis and O. M. Todes. *Zhur. Obshchel Khim.* (*J. Gen. Chem.*) 20, [1981-90](1950).—Roginskii's theory of catalyst modification (*C.A.* 42, 1794*b*) is verified by the kinetics of isooctane oxidation on (I) $MgCr_2O_4$-MgO, (II) $CuCr_2O_4$-CuO, (III) V_2O_5. The catalysts were impregnated with known amts. of impurities (0.5–10%), supported on asbestos and dried at 100°. For I and II the impurities were H_3PO_4, H_3BO_3, $BaSO_4$, Na_2SiO_3, $Ba(NO_3)_2$, and HF. Up to 20% these impurities fail to catalyze when supported directly on asbestos. Sp. surface areas of I with 1.3% H_3PO_4 are (*A* = 4 sq. m./g. (N_2 adsorption at −190°). Pure I and II have spinel structures (by x-rays). The reaction is of order 2, 1, or 0 according to the impurity content (*C.A.* 42, 1794*b*). The order and the activity *k* change abruptly at some crit. concn. of the impurity. Plots of log *k* against (1/*T*) give the activation energy *E* (kcal./mole); k_0 is calcd. from $k = k_0 \exp.(-E/RT)$. The activity is investigated in a 150° interval of temp. between 230° and 500°, depending on the catalyst. KOH is without effect on I but it affects III. The effect of impurities is discussed on the basis of the following results: (*a*) Both k_0 and *E* increase sharply with the impurity content up to a max. They decrease with further addn. of the impurity. The max. corresponds to 2 to 4% impurity and is very pronounced in all cases. *E* varies between 0.6 and 40; log k_0 between 3 and 17. (*b*) There is a linear relation between *E* and log k_0 which fits all data reasonably well. No explanation is offered. From (*a*) it is concluded that the concept of promoter and poison has to be broadened. A given "modifier" may be either a promoter or a poison according to its concn. It may change the order of the catalyzed reaction and it exerts an influence on both *E* and k_0. II. L. Ya Margolis and O. V. Krylov. *Ibid.* 1991–8.—The theory of contact modification is subjected to further test. The complete oxidation of C_3H_6 on $MgCr_2O_4$ + Mg(I) contg. various amts. of Na_2SiO_3 was investigated in an app. already described by M. and Todes (*C.A.* 42, 1794*b*). I was impregnated with the impurity, the catalyst dried at 100° and supported on asbestos. The concn. of Na_2SiO_3 was varied between 1.5 and 5% of pure I; the concn. of the catalyst *c* on the asbestos, between 1 and 3%. Samples contg. 3 g. asbestos were used throughout. The rate const. *k* is proportional to the concn. of catalyst on the support. $k_0 = k/c$ is used to det. *E* from log k_0-(1/*T*) plots; k_0 is defined by $k_0 = k_0 \exp.(-E/RT)$. The kinetic equation for $C_3H_6 + 3\,O_2 = 2\,CO_2 + 2\,H_2O$ was found by varying the C_3H_6 concn. *x* at a const. flow rate of 20 l./hr. The C_3H_6 oxidized depends only slightly on *x*, indicating a 1st-order reaction. *k* was computed by $k = (2.3/bd) \cdot \log[1/(1-y)]$; b_0 is the O_2 concn. = 20.5 (in vol. %); *t* = 0.051, the contact time in min.; *y* is the percentage of CO_2 after the reaction. The temp. was varied between 260° and 470°. The results show a behavior similar to the one found for isooctane oxidation: *E* and k_0 increase with in-

over

creasing amts. of Na_2SiO_3 up to a max. at 2%. The max. is less sharp than in the former case. As a 2nd example, the complete oxidation of isooctane on WO_3 was studied, with NaOH as an impurity. Pure H_2WO_4 was put into soln. by means of an excess of a concd. soln. of NH_4OH. The soln. was evapd. to dryness in a porcelain crucible; the resulting white crystals were decompd. by heating 2 hrs. in air at 450°. The yellow powder WO_3 thus obtained was active. The activity was detd. at a flow rate of 10 l./hr. and a contact time of 0.1 min. The catalyst was supported on asbestos (50%). The activity k was computed from the 1st-order kinetic law; k is proportional to the amt. of catalyst up to 60% on asbestos. The amt. of NaOH impregnating the contact varies between 0.25 and 8% of WO_3. The calcd. k_0 does not have a very high precision (15–20%): this is due to the small activity of the catalyst in the temp. range investigated (280–440°). k, k_0, and E present a sharp max. at 0.75–1% impurity. A linear relation between E and log k_0 is verified. The following catalysts are inactive: (a) asbestos 50, WO_3 50, NaOH 17.3; (b) asbestos 50, NaOH 50; (c) asbestos 99, NaOH 1%. The data are said to confirm the theory of contact modification.

Michel Boudart

TODES, O. M.

Dynamics of sorption on a real granular adsorbent. O. M. Todes and Ya. M. Dikson (Inst. Phys. Chem. Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 75, 727-30(1950).—A gas or liquid contg. the sorbable substance at a concn. c moves down a layer of sorbent at the rate u. The differential equation of the sorption is $\partial c/\partial t = -u(\partial c/\partial x) - (\partial a/\partial t) + D(\partial^2 c/\partial x^2)$, with a = concn. of the sorbable substance at the given depth x of the layer, and the conditions are, at $x = 0$, $c = c_0$ = const., $a = a_0$, $\partial c/\partial x = 0$; at $t = 0$, $x = 0$, $a = 0$, $\partial c/\partial x = 0$. If the sorption is phys. and detd. by diffusion, $\partial a/\partial t = \beta[c - C(a)]$, where $C(a)$ = concn. at the surface in equil. with a. With $\xi = x - vt$ (where v = rate of displacement of the sorption wave), integration over ξ gives $D(dc/d\xi) = (u - v)c - vt$, and Shilov's formula for the propagation of a sorption wave, $v = c_0u/(a_0 + c_0)$. Elimination of ξ gives $da/dc = -G[(a_0 + c_0)/c_0]^2[c - C(a)]/[(a_0c/c_0) - a]$, where $G = \beta D/u^2$ is a dimensionless criterion. In the limiting case of absence of longitudinal diffusion, $G \to 0$, and a is linear in c at the front of the sorption wave, as predicted by Zeldovich. Approx. integration of the above equation permits calcn. of the distribution of the concn. along the layer, and thence the length δ of the operating layer of solvent, $\delta = x(c_0) - x(c_0 - c_t)$, i.e. δ = distance between the x corresponding to c_0 and to $(c_0 - c_t)$, where c_t = concn. of escape. For a Langmuir-type isotherm $A(c) = A_\infty[1 + (c/c_{1/2})]/(c/c_{1/2})$, where $c_{1/2} = c$ corresponding to half-filling of the sorbent, $\delta = [(u/\beta)(1 + G)(2 + (c_0/c_{1/2}))((c_0/c_{1/2}))]\ln[(c_0 - c_t)/c_t]$. The const. β can be expressed by the consts. β_1 and β_2 of external and internal diffusion, $1/\beta = (1/\beta_1) + (1/\beta_2)$. With this substitution, it can be shown that the usual methods of detn. of $1/\beta$ actually yield a magnitude $1/\beta^* = (1/\beta_1) + (1/\beta_2) + (D/u^2)$. Along with internal diffusion, external and longitudinal diffusion play an essential role in macroscopic kinetics of sorption under dynamic conditions. N. Thon

B1'R

8365* **Theory of Grinding of Minerals. III. Separations of Particles of Coarsely Ground Products Into Two Fractions.** (In Russian.) B. M. Zviagin, O. M. Todes, and A. Z. Iurovskii. *Izvestiia Akademii Nauk SSSR*, Section of Technical Sciences, Dec. 1951, p. 1825-1840.

Mathematical analysis plus graphical interpretation.

TODES, O. M.

USSR/Mining - Mineral Dressing, Wet Classification — Aug 51

"On the Theory of Rock Crushing. II. Separation of Crushed Products Into Two Fractions and Calculation of Their Mean Composition," B. M. Zvyagin, R. B. Rozenbaum, O. M. Todes, A. Z. Yurovskiy

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 8, pp 1218-1229

Develops method for detg relative number of floated and settled particles during sepn in liquid into 2 fractions. Suggests also method for detg mean compn of both fractions and presents

205T94

USSR/Mining - Mineral Dressing, Wet Classification (Contd) — Aug 51

graphs for practical calcns. Gives numerical example of calcn. Submitted by Acad A. M. Terpigorev 16 Dec 50.

205T94

TODES, O. M.

PA 196T10

USSR/Chemistry - Oxidants Nov 51

"Experimental Verification of the Theory of Spreading of a Precipitate in a Flat Capillary," P. B. Afanas'yev, O. M. Todes

"Zhur Fiz Khim" Vol XXV, No 11, pp 1273-1280

Following theoretical discussion of subject by above authors and Ya. B. Zel'dovich ("Zhur Fiz Khim" Vol XXIII, No 2, 1949, p 156), proved possibility of use of flat capillary for making quant measurements in case of mutual diffusion of reacting solns. On basis of solns reacting to form difficulty sol salts $BaCrO_4$ and $CuCrO_4$,

196T10

USSR/Chemistry - Oxidants (Contd) Nov 51

verified (a) theoretical calcns of rate of movement of pptn product boundary under mutual diffusion of reaction components in flat capillary and (b) existence of boundary of soln of ppt. Under continuous spreading of reaction product ppt, product's rate of crystn has no effect on course of process proceeding purely by diffusion. Describes optical method for keeping surface of capillary strictly horizontal.

196T10

TODES, O. M.

PA 196T11

USSR/Chemistry - Oxidants Nov 51

"Distribution of Concentrations of Reaction Components and the Periodic Precipitation of the Product in a Flat Capillary," P. B. Afanas'yev, O. M. Todes

"Zhur Fiz Khim" Vol XXV, No 11, pp 1281-1288

Measurements of diffusion coeff of K_2CrO_4 and concn of int component of reaction in flat capillary under formation of difficult sol reaction product e.g., ($CuCrO_4$, $BaCrO_4$) provided addnl verification of theory of spreading of ppt and formation of supersatn in front of it.

196T11

USSR/Chemistry - Oxidants (Contd) Nov 51

By theory and expt verified rule of rising geometric progression of distances between layers of ppt under conditions of its periodic distribution. This was shown by expt to be result of relationship between rate of diffusion of reacting components and rate of crystn of reaction product. Authors indicated possible use of diffusion mixing for prepn of definite high supersatns in solns.

196T11

TODES, O. M.

USSR/Minerals - Ores, Dressing — Dec 51

"Theory of Rock Crushing. III. Separating Products of Coarse Crushing in Two Sizes," B. M. Zvyagin, O. M. Todes, A. Z. Yurovskiy

"Iz Ak Nauk SSSR, Otdel Tekh Nauk" No 12, pp 1825-1840

Attempts to establish optimum conditions of crushing initial products for concn in form of comparatively coarse particles. Discusses distribution of crushed products according to compn, evaluation of final vol of inclusions, integral

205T82

USSR/Minerals - Ores, Dressing (Contd) — Dec 51

function of distribution and continuous distribution, sepn in 2 fractions, and yield and concn deg of floated product. Submitted A. M. Terpigorev.

205T82

C. A.

9

Basic laws of pulverization. O. M. Todes and A. Z. Yurovskii. *Doklady Akad. Nauk S.S.S.R.* 77, 407-9 (1951).—Math. representation of the fundamental laws of pulverization leading to the choice of a rational system of grinding for processes of coneg. combustible minerals. The theory is based on a hypothetical ore of simplest form consisting of one mineral included in another. For this ore the following relation is given: $a/\delta = k$, where a is the average length of the particles of included mineral and δ is the particle length to which the original ore is ground, and k is called the degree of pulverization. It is shown how to evaluate the max. and min. values of k for the practical limits of grinding. These limits were found to be: $k_{min.} = 0.05$ and $k_{max.} = 30$. T. and Y. discuss elsewhere the problem of the coarse and fine grinding of minerals for cases of homogeneous and heterogeneous inclusions. G. S. M.

TODES, O. M.

USSR/Chemistry - Catalysts Jan/Feb 52

"Catalytic Oxidation of Ethylene on Magnesium Chromite," L. Ya. Margolis, O. M. Todes, Inst of Phys Chem, Acad Sci USSR

"Iz Ak Nauk, Otdel Khim Nauk" No 1, pp 52-58

Studied oxidation of ehtylene on a Mg-Cr catalyst with added sodium silicate at static conditions under 2-mm Hg pressure. Catalyst activity decreases because of the occurrence of 2 simultaneous processes, oxidation and adsorption of the component. Catalyst activity can be restored

208T3

USSR/Chemistry - Catalysts (Contd) Jan/Feb 52

by surface treatment with oxygen. Under dynamic conditions, the surface is continuously regenerated by a slight excess of O_2, and catalyst activity remains const for long periods. Under static conditions, catalyst with admixts exhibited characteristic phenomena of modification previously observed under dynamic conditions.

208T3

STOLYAROV, V. A., DrSc, C.Z.

Styrene

Kinetics of styrene hydrogenation and determination of adsorption from solutions. Zhur. fiz. khim. 26, no. 1, 1952.

MONTHLY LIST OF RUSSIAN ACCESSIONS, LIBRARY OF CONGRESS, SEPTEMBER 1952. UNCLASSIFIED.

TODES, O. M.

CATALYSIS

Chem Abs V48
1-25-54
General & Physical
Chemistry

Chem.

(1)

The rate constant of the "overcondensation" process. O. M. Todes. *Kolloid. Zhur.* 15, 391-3(1953).—"Overcondensation" is dissoln. of small particles and simultaneous growth of larger particles. If N_0 is the initial no. and N the no. of particles after time t, then $(1/N) = (1/N_0) + (D\sigma xMVt/RTX)$; D is the diffusion coeff., σ free interfacial energy, MV the mol. vol. of the solid phase, and X the total concn. of solid and dissolved disperse substance. The equation was applied to the growth of AgBr crystals in the presence of gelatin (cf. Ipatov, *Uspekhi nauchnoĭ fotografii* 1, 39(1951)). From the expts., $D\sigma$ was approx. 0.008 erg/ sec.

J. J. Bikerman

8-31-54

USSR

Application of solution kinetics of potassium dichromate to a study of the mass exchange in heterogeneous systems in the region of convection diffusion. N. I. Litunovskii, I. I. Petrenko, and O. M. Todes. *Zhur. Tekh. Fiz.* 23, 1321–32(1953).—The solin. of $K_2Cr_2O_7$ crystals in H_2O, stirred with a stirrer rotating at 1200 r.p.m. was studied by a previously developed method (*cf. ibid.* 1135–43). The decrease dR/dt of the particle size depends on the convection and diffusion of a supersatd. layer formed around the particle. The criteria of Nusselt, Reynolds, and Prandtl can be calcd. from measurements of dR/dt, detd. from an increase in the concn. of the solute and from measurements of the movement of particles. The vertical distribution of crystallites in a turbulent stream is similar to that of gas mols, and it is given by the formula $n(h) = n_0 \exp(-3gh/u_*^2)$. The no. $n(h)$ of particles per cc. at the height h was detd. experimentally, by sampling, and from this the velocity u_* was detd. for particles of different size. The pulsating velocity of the stream, v_0, can be calcd. from the knowledge of u_* and the diam. of particles. The criterion of Reynolds (Re) can be calcd. from $Re\,(v_0 - u_*)d/\nu$ (ν = viscosity of H_2O) and from this the criterion of Nusselt (Nu) can be obtained. Since laws of mass exchange and heat exchange are similar, the detn. of Re and Nu by this method is applicable to other types of turbulent mixing, such as the combustion of powd. fuel.

S. Pakswer

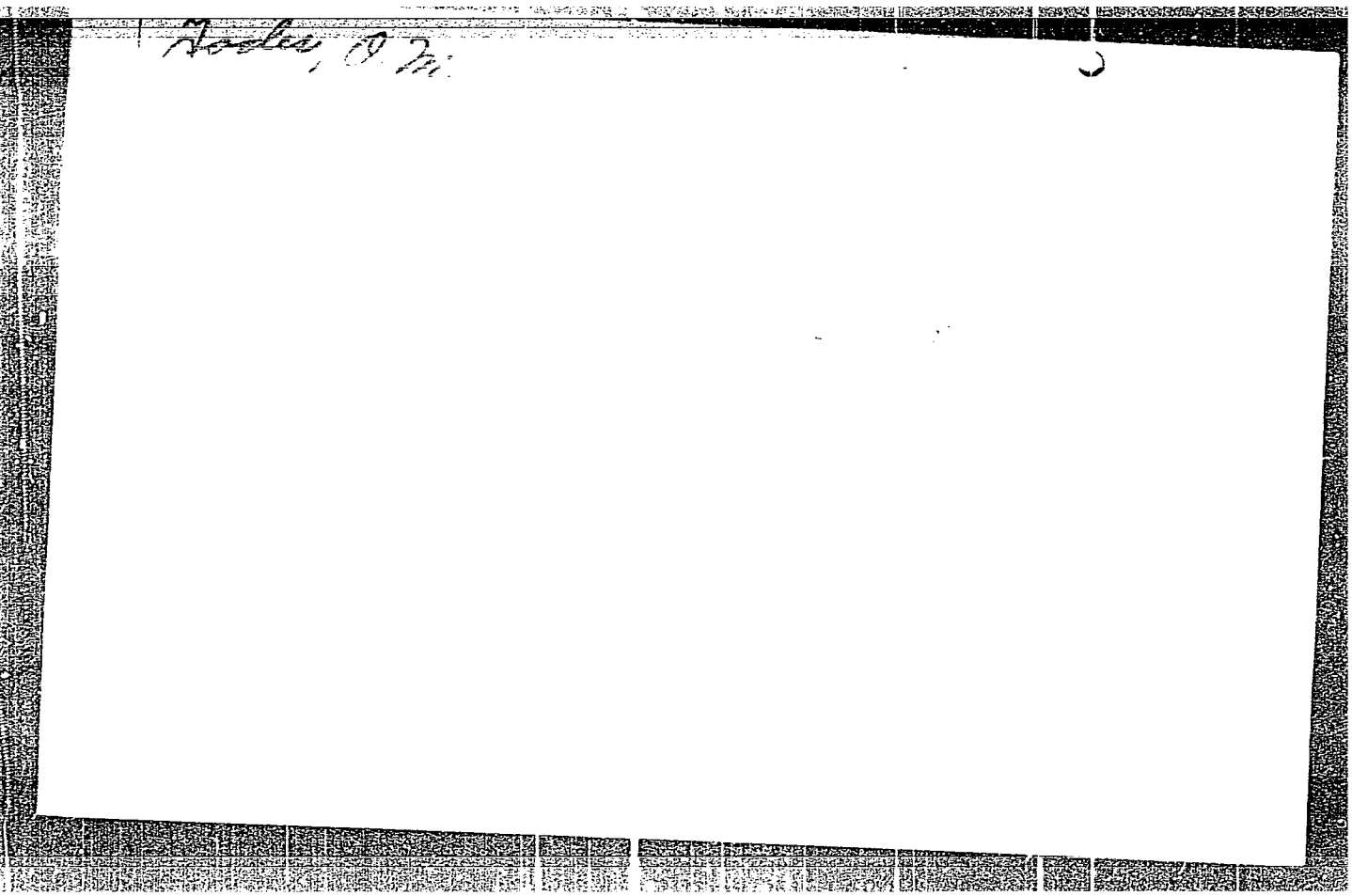
TODES, O. M.

Chemistry - organic

CATALYSTS

Abstracting 6

1730* Kinetics of Hydrogenation of Styrene on a Stationary Catalyst. (Russian.) E. A. Stolliarov and O. M. Todes. *Zhurnal Fizicheskoi Khimii*, v. 27, no. 3, Mar. 1953, p. 370-378. Studies have shown that hydrogenation on a stationary catalyst is a more complex process than on a powder catalyst. Table, graph. 18 ref.



TODES, O. M.

USSR/Chemistry - Catalysts Oct 53

"Oxidation of Ethylene (I) and Ethylene Oxide (II) on Oxide Catalysts and on Silver," O. M. Todes, T. I. Andrianova, Inst Phys Chem, Acad Sci USSR

Zhur Fiz Khim, Vol 27, No 10, pp 1485-89

Compared the kinetics of the oxidation of I and II on a Mg-Cr oxide catalyst and Ag. Found that I is oxidized to II over Ag, while both I and II form only carbon dioxide and water over Mg-Cr oxide, i. e. the oxidation of I is complete and proceeds without intermediate formation of II.

272T9

Todes, O. M.

21 Jan 53

USSR/Chemistry - Combustion Kinetics

"The Oxidation of Ethylene and Ethylene Oxide Over Various Catalysts," O. M. Todes and T. I. Andrianova

DAN SSSR, Vol 88 No 3, pp 515-518

The rate of oxidation of ethylene and ethylene oxide over Ag and Cr-Mg catalysts was studied. CO_2 formation is a secondary reaction over AG catalyst. The ethylene is first oxidized to ethylene oxide which is then oxidized into CO_2 and water. Presented by Acad A. N. Frumkin 19 Nov 52

265 T 18

AMMOSOV, I.I.; ZVYAGIN, B.M.; TODES, O.M.; YUKOVSKIY, A.Z.; MARCHENKO, M.G., redaktor; TENNIS, I.G., redaktor; POLYAKOVA, T.V., tekhnicheskiy redaktor.

[Engineering calculations on the theory of exposing minerals in the process of dressing coal.] Inzhenernye raschety k teorii raskrytiia mineralov v protsesse obogashcheniia uglei. Moskva, Izd-vo Akademii nauk SSSR, 1955. 157 p. (MLRA 8:12)
(Coal preparation)

USSR/Physics - Thermodynamics, Applied FD-3200

Card 1/1 Pub. 153-9/28

Author : Vetrov B. N. and Todes O. M.

Title : Measurement of heat emission coefficient from a gas flow to the furnace charge in conditions of non adiabatic heating. I.

Periodical : Zhur. Tekh. Fiz., 25, No 7, 1217-1231, 1955

Abstract : An indirect method is applied for determining the coefficient of heat emission by a hot gas stream to the furnace charge by comparing experimental with theoretical curves. The theoretical results were improved by deriving a formula for computing the volume coefficient of heat emission in real, i.e. non adiabatic conditions. These theoretical results agree with experimental data. Ten references, including 5 foreign.

Institution :

Submitted : June 5, 1954

USSR/Physics - Thermodynamics, Applied FD-3202

Card 1/1 Pub. 153-11/28

Author : Vetrov B. N. and Todes O. M.

Title : Heat wave propagation during heating of the furnace charge by a gas stream. III.

Periodical : Zhur. Tekh. Fiz., 25, No 7, 1242-1247, 1955

Abstract : The two previous articles are generalized to a case of heat exchange between the gas stream and the furnace charge in non adiabatic conditions taking into account the conductive heat transfer along the charge. The previously derived equations of thermal equilibrium are used for analysis. Reference is made to the two previous articles by authors.

Institution :

Submitted : June 5, 1954

The theory of ion-exchange dynamics. I. Dynamics and kinetics of ion exchange during transfer in a parallel. O. M. Todes and V. V. Rachinskii (K. A. Timiryazev Agr. Acad., Moscow). *Zhur. Fiz. Khim.* 29, 1591–1604(1955).—The theoretical analysis of the dynamics and kinetics of ion exchange is based on the solution of differential equations of equil. for the equil. const. $k_H < 1$. A stationary front is shown to form at $k_H < 1$, the rate of motion of that front and its width are expressed by formulas derived by the authors. The theoretical results were confirmed experimentally by radiochromatographic methods, by means of which the dynamics and kinetics of the Na^+, K^+, and Rb^+ ions were studied. The sorption velocity const. was detd. and was found to be of the order of 0.6–0.7/sec. A supposition is made, supported by expts., that ions can be filtered together with the liquid stream through the grains of swelling resins.

W. M. S.

TODES, O. M.

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 18/21

Authors : Todes, O. M., and Rachinskiy, V. V.

Title : Theory of the dynamics of ion exchange. Part 2. Dynamics of exchange at concave isothermal curve

Periodical : Zhur. fiz. khim. 29/10, 1909-1914, Oct 1955

Abstract : The problem of ion exchange dynamics was investigated on the basis of the equilibrium sorption dynamics theory at an exchange constant of $K_{12} > 1$. The theoretical results were experimentally verified by means of the radiochromatographic method. It was found that the experimental and theoretical evaluations of the rate of expansion of the ion front for marked Na were in satisfactory agreement. New experimental data are given regarding the filtration of a solution through the grains of ion-exchange tar KU-2. Three USSR references: (1948-1955). Graphs.

Institution : Agricultural Academy im. K. A. Timiryazev, Moscow

Submitted : April 8, 1955

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1257
AUTHOR VETROV, B.N., TODES, O.M.
TITLE The Heat Transfer in Tubes with Depositions.
PERIODICAL Žurn. techn. fis, 26, fasc. 4, 800-808 (1956)
Publ. 4 / 1956 reviewed 9 / 1956

Theoretical analysis of the problem: The present work theoretically and experimentally investigates the heat transfer from a moved gas and from an immovable layer of solid particles to the walls of a tube. The velocity of the steady heat exchange through the wall of the tube is essentially determined by the effective heat conductivity λ_e of the layer. In the case of $d/D > 1/12$ the dependence of the NUSSELT number on an additional criterion for d/D must be considered. If the material of the deposited particles is not too much heat conductive, another criterion for λ_g / λ_s must yet be considered. Here d denotes the diamter of the deposited particles, D - diameter of the tube, λ_g and λ_s heat conductivity of the gas and of the solid particles respectively. In the case of a flowing gas REYNOLD'S and PRANDTL'S numbers must in addition be taken into account.
Experimental methods are discussed on the basis of a drawing showing the test order which, essentially, consists of a brass cylinder enclosed by an exterior shell through which water from the main flows. The height of the deposited layer can be regulated by means of a grid. Several thermopiles introduced into the cylinder through transversal channels leading through the shell

measure the difference in temperatures in the interior of the cylinder and in the surrounding medium.

Experimental results: A certain concrete experiment finished the following data: Air consumption = 91 litres per minute, = 5,45 m^3/hour. The flow velocity computed herefrom amounts to 1090 m/hour. The temperatures indicated by the thermopiles after temperature distribution has become steady are shown in a table. The coefficient of heat transfer from the cylindrical layer to the walls is then 25,7 KKal/m^2.hour.grad, and REYNOLD'S number on the occasion of this experiment amounts to 52,5. The results of all experiments which were carried out with sand are shown together in a table. At Re < 50 the values of the heat transfer coefficient fluctuate about 20 KKal/m^2.hour.grad. A special test carried out at Re = 0 by the method of quasistationary cooling of the entire tube furnishes the value 16,2 KKal/m^2.hour.grad for these coefficients. At Re → this coefficient probably tends towards the value 16, which agrees well with the data of other tests. Tests carried out in a similar manner with steel balls of 6 mm diameter (porosity ε = 0,40) furnish a value of ~ 22 for the heat transfer coefficient at Re → 0. Similar results were obtained also with shot with d = 2 mm.

INSTITUTION:

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 3/35

Authors : Stolyarov, Ye. A., and Todes, O. M.

Title : Effect on composition and conditions of preparation of nickel-aluminum alloys on the properties of a skeletal catalyst obtained from these alloys

Periodical : Zhur. fiz. khim. 30/1, 23-27, Jan 1956

Abstract : The relation between the composition and preparation of Ni-Al alloys and the activity of skeletal Ni-catalysts obtained from such alloys was investigated. It was found that catalysts prepared from such alloys usually contain very little Al but are highly active. The catalytic activity of a skeletal Ni-Al catalyst was established by styrene hydrogenation and the quality of the alloy was determined by metallographic study. Twenty-one references: 17 USSR, 2 Eng. and 2 Germ. (1929-1952). Tables; illustrations.

Institution : State Institute of Applied Chemistry, Leningrad

Submitted : March 12, 1955

Todes, O. M.

USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis, B-9

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 452

Author: Andrianova, T. I., and Todes, O. M.

Institution: None

Title: Kinetics of the Catalytic Oxidation of Ethylene on Silver

Original Periodical: Zh. fiz. khimii, 1956, Vol 30, No 3, 522-531 (with a summary in English)

Abstract: The kinetics of the oxidation of C_2H_4(I) and C_2H_4O (II) by air and nitrogen-oxygen mixtures with 2 Ag catalysts at 250-300° have been investigated. It has been established that the oxidation of II to CO_2 and H_2O proceeds slowly according to the kinetic equation: $-dC_{C_2H_4O}/d\tau = 4 \cdot 10^5 \exp(-21{,}000/RT) \cdot C_{C_2H_4O}C_{O_2}$, while the oxidation of I to II proceeds relatively fast and is accompanied by diffusive complications; the over-all kinetic equation for the second reaction is $-dC_{C_2H_4}/d\tau = 100 \exp(-13{,}000/RT)\sqrt{u}C_{O_2}$, where u is the flow rate. On

Card 1/2

USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis, B-9

Abst. Journal: Referat Zhur - Khimiya, No 1, 1957, 452

Abstract: the basis of the relative oxidation rates of I and II and of the fact that the concentration of II passes through a maximum when I is oxidized to CO_2, the authors have drawn the conclusion that the oxidation of I proceeds in 2 steps with the formation of II in the first step, and of CO_2 and H_2O from II in the second step. A mathematical analysis has been made of the kinetics of the simultaneously occurring successive oxidations of I to II and II to CO_2. The relationship between the maximum concentration of II and the time required to attain it has been investigated as a function of the initial composition of the gas, the temperature, and the flow rate on the basis of the above-indicated 2-stage mechanism for the oxidation of I, which has been sufficiently confirmed by experiment.

Card 2/2

TODES, O.M.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1772
AUTHOR ZARKOVSKIJ,A.G., TODES,O.M.
TITLE The Reflection of Waves by an Isotropic Inhomogeneous Layer.
PERIODICAL Žurn.eksp.i teor.fis,31,fasc.5, 815-818 (1956)
Issued: 1 / 1957

Particular interest is caused in practice by strata-like media for which the optical constants within the layer and on its boundaries may suddenly change. For such cases the approximation method discussed in the present paper is best employed.

The Solution Method: Let us investigate an unlimited stratumlike inhomogeneous plate with the thickness d, upon which from the left a plane electromagnetic wave impinges under a certain angle θ_1 against the vertical. On this occasion the wave is partly reflected by the front boundary, partly passes through the layer, and emerges from the layer through a second boundary under a certain angle θ_2. A formula is explicitly given for the constant distribution of the electromagnetic waves in the layers. The dielectricity constant $\varepsilon(z)$ and the conductivity $\sigma(z)$ are assumed to change along the layer according to a certain ruke. The medium located on the right and on the left of the layer as well as the layer itself are assumed to be nonferromagnetic with the dielectricity constant = 1. The reflection coefficient of the wave on the layer must be carried out separately for the waves which are polarized parallel and vertical to the plane of incidence. At first an s-wave is studied the electric vector of which is vertical to the plane of incidence. On this occasion the amplitude $E = E_y$

Todes, O. M.

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 35/54

Authors : Todes, O. M., and Lezin, Yu. S.

Title : Adsorption dynamics at high concentrations and heat liberations

Periodical : Dok. AN SSSR 106/2, 307-310, Jan 11, 1956

Abstract : The adsorption of ethyl alcohol and benzene was investigated over an activated carbon to determine the dynamics of the adsorption at high concentrations and heat emission. It was established that the heat liberated when the rate of the thermal wave is greater than the rate of the isothermal sorption wave is blown away by the passing stream and the adsorption occurs on a cold sorbent. When the rate of the isothermal sorption wave is greater than the thermal wave then the heat liberated during the adsorption is not carried away by the passing vapor air-stream which leads to a reduction in the static activity of the sorbent in the zone of absorption. The two qualitatively different adsorption dynamics observed are described. Two USSR references (1929-1954). Graphs.

Institution : .....

Presented by: Academician M. M. Dubinin, July 7, 1955

TODES, O.M., professor; BONDAREVA, A.K.

Characteristics of fluid processes. Khim. nauka i prom. 2 no.2:223-232 '57. (MLRA 10:6)

(Cracking process) (Fluidization)

TODES, O.M.

USSR/Physical Chemistry - Colloid Chemistry, Dispersion Systems. B-14

Abs Jour: Referat. Zhurnal Khimiya, No 3, 1958, 7355.

Author : O.M. Todes, A.A. Chekunov.
Inst :
Title : Influence of Atmospheric Turbulence of Coagulation Kinetics of Aerosols.

Orig Pub: Kolloidn. zh., 1957, 19, No 4, 490-495.

Abstract: Small-scale turbulent pulses do not essentially increase the constants of the coagulation rate at the movement of an aerosol cloud consisting of minute particles of dimensions of the 10^{-6} to 10^{-5} cm order. Large-scale pulses disperse and enlarge the cloud and decrease the absolute coagulation rate by it. Therefore, the particle dimensions of an aerosol cloud in the atmosphere increase considerably slower with time than in a closed space.

Card : 1/1

USCOMM-DC-54637

~~ROZENBAUM, R.B.~~ TODES, O.M.

20-3-23/59

AUTHORS: Rozenbaum, R.B., Todes, O.M.

TITLE: The Restrained Fall of a Sphere in a Cylindrical Tube (Stesnennoye padeniye shara v tsilindricheskoy trubke)

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol. 115, Nr 3, pp. 504-507 (USSR)

ABSTRACT: The analysis of the problem of the free fall of a solid sphere in a viscous liquid by the methods of the similarity theory leads to the conclusion that the velocity of the steady case is determined from a universal dependence of the type Re=f(Ar). For simplifying the calculations an interpolation formula is chosen here which describes the law of drag in the entire domain in the case of laminar and turbulent flowing around till the crisis. The authors select a simple interpolation formula of the type $Re = Ar/(18 + 0{,}61 \sqrt{Ar})$. At small values of the determining criterion by Archimedes $Re = (1/18)\,Ar$ is obtained from the just mentioned formula, which corresponds to the resistance law by Stokes. At large values of Ar $Re = (1/0{,}61)\sqrt{Ar}$ applies, which corresponds to Newton's law of resistance with the drag coefficient 0,39. In the case of the fall of a

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20-3-23/59

The Restrained Fall of a Sphere in a Cylindrical Tube

little sphere along the axis of a cylindrical tube of the diameter D (which is not much larger than the diameter of the sphere) the second determining criterion also occurs in the problem and the law of drag must read $Re = F(Ar, d/D)$. For clearing up the character of this dependence, the authors carry out a provisional qualitative theoretical analysis. In the case of highly restrained motion $F = C_1 \pi d^2 \mu vd/(D - d)^2$ is found. In this connection d signifies the diameter of the sphere, v - the velocity of the steady case, D - the diameter of the tube, ρ - the density of the liquid, and $\nu = \mu/\rho$ applies. From this further follows $Re = \text{const}. Ar(1 - d/D)^2$. Thus the new criterion $Ar^* = Ar(1 - d/D)^2$ is obtained instead of Archimedes' criterion. At high velocities of motion $F \sim (\rho v^2/2)(\pi d^2/4)$ and $Re = \text{const} \sqrt{Ar(1 - d/D)^2}$ are found. In the domain of the turbulent flowing around the restraint of the free fall manifests itself above all by the replacement of the criterion Ar by the criterion Ar*. At mean values of d/D the dependence $Re = F(Ar, d/D)$ must assume the form $Re = \varphi_2(d/D)\, Ar^*/0{,}61$. The position of the transition domain between the linear and the quadratic law of resistance for the free case is determined by the amount of the criterion

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20-3-23/59

The Restrained Fall of a Sphere in a Cylindrical Tube

$Re = vd/\nu$ which determines the ratio of the forces of inertia to the forces of viscosity. But the transition domain lies at about the same values of Re and Ar*, i.e. $Fe(Ar, d/D) \sim f(Ar^*)$. The experiment then serves only for a precise definiton of this dependence and the determination of the corresponding corrective factor: $F(Ar, d/D) = \varphi(Ar^*, d/D) f(Ar^*)$. The results from more than 1000 tests confirm the authors' predictions and permit the determination of the corrective factors: They give the following form: In the linear domain: $\varphi_1(d/D) = 1 - 0{,}6\ d/D$, in the quadratic domain: $\varphi_2(d/D) = 1 + 2{,}1\ d/D\ (1 - d/D)$. An interpolation formula is given for the intermediary domain. There are 3 Slavic references.

ASSOCIATION: Leningrad Mining Institute(Leningradskiy gornyy institut)
PRESENTED : March 28, 1957, by P.A. Rebinder, Academician
SUBMITTED: March 27, 1957
AVAILABLE Library of Congress

Card 3/3

TODES, O. M.

24(4) PHASE I BOOK EXPLOITATION SOV/1490

Zisman, Girsh Abramovich, and Oskar Movshevich Todes

Kurs obshchey fiziki. T. 1: Mekhanika, molekulyarnaya fizika, kolebaniya i volny (Course of General Physics. Vol: Mechanics, Molecular Physics, Oscillations and Waves) Moscow, Fizmatgiz, 1958. 330 p. 25,000 copies printed.

Ed.: V. I. Rydnik; Tech. Ed.: S.S. Gavrilov.

PURPOSE: This is a textbook of elementary physics for students attending vuzes and vtuzes.

COVERAGE: This is the first volume of a three-volume elementary physics textbook. The text is to be studied over a period of three semesters. The first volume includes the principles of mechanics, molecular physics, and thermodynamics, as well as the physics of real gases, fluids, and solids, and finally, oscillations, waves, and sound. The first volume was reviewed by the Physics Department of the Leningradskiy Dom uchenykh (Leningrad House of Scientists), as well as by Professor G.S. Kvater, of Leningrad University, reviewer for the Publishing House. There are no references.

Card 1/7

GOROSHKO, V.D.; ROZENBAUM, R.B.; TODES, O.M.

Approximate hydraulic characteristics of fluidized bed and solids flow. Izv. vys. ucheb. zav.; neft' i gaz no.1:125-131 '58. (MIRA 11:8)

1.Leningradskiy gornyy institut i Institut goryuchikh iskopayemykh AN SSSR.
(Cracking process)

TODES, O.M., prof.; ZVYAGIN, B.M., dots.; BOGORAD, Ye.A., nauchnyy sotrudnik

Petrographic method of determining the true size of impurities. Izv.vys.ucheb.zav.; gor.zhur. no.4:125-128 '58. (MIRA 11:11)

1. Leningradskiy gornyy institut i Institut goryuchikh iskopayemykh AN SSSR.

(Coal preparation)

TODES, O. M.; KAISHEV, P. I.;

"The kinetics of formation and destruction of aerosols."

report presented at the Fourth All-Union Conference on Colloidal Chemistry, Tbilisi, Georgian SSR, 12-16 May 1958 (Koll zhur, 20,5, p.677-9, '58, Taubman, A.B)

REZNIKOVICH, K.A.; TOMES, O.M.

Power characteristics of the vertical pneumatic-tube transportation. Izv. vys. ucheb. zav.; neft' i gaz 2 no.8:109-113 '59. (MIRA 12:11)

1.Vyssheye voyenno-morskoye uchilishche im. F.E. Dzerzhinskogo, i Vyssheye inzhenerno-tekhnicheskoye uchilishche Voyenno-morskogo flota (VMF).
(Pneumatic-tube transportation)

S/044/62/000/006/067/127
B168/B112

AUTHORS: Todes, O. M., Zvyagin, B. M.

TITLE: A linear method of determining the distribution function of inclusions from their sizes

PERIODICAL: Referativnyy zhurnal. Matematika, no. 6, 1962, 15, abstract 6V78 (Zap. Leningr. gorn. in-ta, v. 37, no. 3, 1959 (1961), 58-63)

TEXT: The case where inclusions (impregnations) have a spherical form (report 6V77) is investigated. A linear method of determining the size distribution of inclusions, in which the lengths of segments of intersections of inclusions are measured as arbitrary straight lines, is proposed. It is noted that this method is simpler, both theoretically and experimentally, than the planimetric method described, for instance, in a work by Verzhbinskiy (report 6V77), although of course it is less accurate. [Abstracter's note: Complete translation.]

Card 1/1

S/180/60/000/004/026/027
E071/E433

AUTHORS: Goroshko, V.L., Todes, O.M. and Yurovskiy, A.Z.
(Moscow)

TITLE: An Extension in the Possibilities of Application of Penetrating Radiations in Coal Beneficiation Processes

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No.4, pp.185-186

TEXT: During the last few years a number of investigations on the application of γ and X-rays for the automation of coal beneficiation processes was carried out in the USSR. As a result, various separators were proposed in which the dependence of the degree of absorption of rays on the content of mineral admixtures in coal was utilized. The scheme proposed suffered from a limitation caused by the influence of differences in the particle size on the degree of absorption. In the paper two schemes of compensating the degree of absorption of rays for the thickness of coal particles are outlined. The two-rays scheme (Fig.1) is based on the utilization of differences in the degree of absorption of γ or X-rays of a low and medium power by a piece

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S/180/60/000/004/026/027
E071/E433

An Extension in the Possibilities of Application of Penetrating Radiations in Coal Beneficiation Processes

of coal. If both rays are passed through the same piece of coal and their intensities measured, then a mathematical treatment of the data obtained permits determining mass coefficients of absorption of the rays used. A single ray method (Fig.2) is based on the application of an electromechanical corrector with a moving probe. The position of the probe is determined by the size of the coal pieces passing under it. The probe is connected with an apparatus regulating any electrical value (resistance, capacity, inductivity etc); this apparatus is incorporated into the measuring system and compensates for the non-uniformity of coal pieces. There are 3 figures and 2 Soviet references.

SUBMITTED: March 9, 1960

Card 2/2

TODES, O.M. (g.Leningrad)

Investigation of fluidized layer in processes in the Polish People's Republic. Inzh.-fiz. zhur. no.12:123-129 D '60. (MIR 14:3)
(Poland--Fluidization)

TODES, O.M.; SHAPIRO, A.P.

Diffusion kinetics for a nonuniformly accessible surface. Kin. i kat. 1 no.2:324-332 Jl-Ag '60. (MIRA 13:8)

1. Yakutskiy gosudarstvennyy universitet.
(Diffusion)

80280
S/170/60/003/02/22/026
B008/B005

24.5200

AUTHORS: Bondareva, A. K., Todes, O. M.

TITLE: Thermal Conductivity and Heat Exchange in a Boiling Layer

PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 2, pp. 105-110

TEXT: The authors comment the papers by S. S. Zabrodskiy (Refs. 1-3) which discuss theoretical ideas on the mechanism of heat transfer through a boiling (pseudoliquefied) layer of solid particles and the character of their chaotic movements. Special attention is paid to Ref. 3 which compares the conductivity coefficients determined by various research workers, and discusses the experimental data indicated by the authors. Two assumptions with respect to the movement of particles in the boiling layer, and the relation between their velocity of movement and the actual thermal conductivity are pronounced at the beginning. On the basis of these assumptions, the movement of particles may be either characterized like the movement of gas molecules, or like the turbulent pulsations in the liquid. The authors prefer the latter

Card 1/2

assumption, and give a number of proofs which speak in favor of this assumption (Fig. 1, Tables 1 and 2). The second problem discussed by Zabrodskiy deals with the correctness of a division of the total heat transfer resistivity from the wall of the boiling layer, in the heat output resistivity, and the resistivity to heat of the layer itself $\frac{1}{K} = \frac{1}{\alpha_{wall}} + \frac{\delta}{\lambda}$. This problem is of high importance for technology and planning. A method for a simultaneous determination of λ and α_{wall} (heat exchange coefficient of the wall) by one single experiment is suggested. On the whole, the values of the summary heat transfer coefficients K determined on the basis of the division of the resistivity to heat into its components do not differ from the values determined in the usual way. The authors, however, hold the opinion that such a division is more natural, and besides permits to discover some characteristic features of the process of movement of particles in the boiling layer. Fig. 2 shows the heat transfer from the turbulent flow through a solid wall, and Fig. 3 the heat transfer from the wall through a boiling layer. There are 3 figures, 2 tables, and 8 references, 7 of which are Soviet.

TODES, O.M. (Leningrad); FEDORTSOV, V.F. (Leningrad); CHEKUNOV, A.A. (Leningrad)

Experimental investigations of the light scattering of coagulating aerosols. Koll.zhur. 22 no.1:90-96 Ja-F '60. (MIRA 13:6)
(Aerosols--Optical properties)

TODES, O.M., prof.; SCHAY, Geza, dr. prof.

Thermal expension of simple crystals. Acta chimica Hung 22 no.1:111-115 '60. .. (EEAI 9:9)

1. Institut Goryuchikh Iskopayemykh Akademii nauk SSSR, Moskva (for Todes). 2. Central Research Institute for Chemistry of the Hungarian Academy of Sciences, Budapest (for Schay)
(Crystals)

DOBYCHIN, D.P.; KLIBANOVA, TS.M.; TODES, O.M.

Calculation of the kinetics of the process taking place in the reactor from the data of modeling experiments with a single pellet. Zhur.prikl.khim. 33 no.7:1519-1526 Jl '60. (MIRA 13:7)

(Catalysts) (Cracking process)

DOBYCHIN, D.P.; KACHUR, L.A.; TODES, O.M.

Modeling of the thermal regime for the process of regeneration of an aluminosilicate cracking catalyst at rest. Zhur. prikl. khim. 33 no.8:1779-1783 Ag '60. (MIRA 13:9)
(Aluminosilicates) (Cracking process)

S/081/61/000/019/013/085
B101/B147

AUTHOR: Todes, O. M.

TITLE: Kinetics of evaporation

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 19, 1961, 48, abstract 19B372 (Tr. Odessk. un-ta. Ser. fiz. n., v. 150, no. 7, 1960, 207-208)

TEXT: The author discusses the applicability of Sreznevskiy's law in the presence of a flow streaming around the evaporating drop. [Abstracter's note: Complete translation.]

Card 1/1

ACC NR: AT7000304 SOURCE CODE: UR/3142/60/150/007/0207/0208

AUTHOR: Todes, O. M.

ORG: None

TITLE: Vaporization kinetics

SOURCE: Odessa. Universitet. Trudy, v. 150. Seriya fizicheskikh nauk, no. 7, 1960. Voprosy ispareniya i goreniya v dispersnom vide (Problems of evaporation and combustion in the dispersed state), 207-208

TOPIC TAGS: vaporization, Reynolds number

ABSTRACT: The author attempts to reconcile contradictory experimental and theoretical data on the reduction in the surface of a vaporizing drop in a flow with time. While experiments show a nearly linear relationship, theory predicts an increase with the Reynolds number. The following theoretical formula is proposed: $-dS/dt=a+b\sqrt{S}$, where b is proportional to the square root of flow velocity. This shows that the reduction in surface vaporization should be noticeable only at the end of the process. Thus when the ratio of the vaporizing surface to the initial value is greater than 0.1-0.2, experimental data should give straight lines described by the equation $S=S_0-(a+b\sqrt{S_0})\cdot t$, and the slope of these lines should correspond to the theoretical relationships between vaporization rate, flow condition and initial drop size. Orig. art. has: 1 formula.

SUB CODE: 20/ SUBM DATE: None

Card 1/1

TODES, O. M., and BONDAREVA, A. K.

"Thermal Conductivity of a Boiling Layer."

Report submitted for the Conference on Heat and Mass Transfer, Minsk, BSSR, June 1961.

ZISMAN, Girsh Abramovich, dots.; TODES, Oskar Movshevich, prof.; BREUS, T.K., red.; VERES, L.F., red.; KRYUCHKOVA, V.N., tekhn. red.

[General physics course] Kurs obshchei fiziki. Moskva, Gos. izd-vo fiziko-matematicheskoi lit-ry. Vol.3. [Optics, atomic and molecular physics, physics of atomic nuclei and elementary particles] Optika, fizika atomov i molekul, fizika atomnogo iadra i elementarnykh chastits. 1961. 444 p. (MIRA 14:10)
(Physics)

GUPALO, Yu.P.; PETRENKO, I.I.; ROZENBAUM, R.B.; TODES, O.M.

Measuring density pulsations in a fluidized bed. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.4:123-127 Jl-Ag '61. (MIRA 14:8)

(Fluidization—Density)

25604

S/197/61/000/006/004/007
B104/B201

21.5210

AUTHORS: Kravchenko, V., Todes, O.

TITLE: Circulation of irradiated materials in an atomic reactor (in loops). II. Analysis of steady and unsteady conditions.

PERIODICAL: Akademiya nauk Latviyskoy SSR. Izvestiya, no. 6(167), 1961, 32 - 41

TEXT: In the first part of the present work, the authors have studied the principal schemes of the circulation of materials in atomic reactors, and they suggested a "boiling bed" system (Izv. AN Latv. SSR, no. 6(167), 1961, 27 - 32). This first part also contains the equations describing circulation and activity of the irradiated material. Analysis of the steady-state solutions of these equations proves the effect of the parameters of circulation lines upon the maximum intensity of the activated material. A study of the unsteady conditions permits estimating the time required for the setting of steady conditions. Transport lines consisting of band conveyors or tube lines are examined first. The relation

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$$A^* = A\frac{(1-e^{-\lambda\tau})(1-e^{-\lambda\tau^*})e^{-\lambda\tau_k}}{\lambda\tau\{1-e^{-\lambda(\tau+\tau^*+2\tau_k)}\}} \qquad (3.9)$$

is obtained for the total activity in the emission chamber; A is the number of neutrons penetrating into an irradiated element per unit time, and being absorbed in it; τ is the time spent in the irradiation zone, τ^* that in the emission zone. This formula allows analyzing A* as a function of the parameters of the circulation system. The activity of the emitting material was found to drop rapidly when the transport rate of the material subjected to irradiation is low. To increase the steady activity of the emission chamber, the circulation rate of the material must be augmented. When the value $\max(\lambda\tau_i) < 0.2$ is attained, a further rise of the circulation rate becomes inexpedient, as the mechanical expenditure increases, without achieving any appreciable rise in activity. A_{max} depends on the parameters of the apparatus; it increases with the lengths of emission chamber and irradiation chamber, and decreases with a

Circulation of irradiated materials ...

prolongation of the piping. For loops from two apparatuses with "boiling beds", the equation

$$A^* = \lambda N^* = A \frac{\lambda\tau^* \cdot e^{-\lambda\tau_k}}{(1+\lambda\tau)(1+\lambda\tau^*) - e^{-2\lambda\tau_k}} \leqslant A \qquad (3.15)$$

is derived which is analogous to (3.9), and the equation

$$A^* = A \frac{\left(1 - e^{-\lambda\tau^*}\right) e^{-\lambda\tau_k}}{1 + \lambda\tau - e^{-\lambda(\tau^* - 2\tau_k)}} \qquad (3.18)$$

for the mixed case. It can be easily shown that the limiting values of these three formulas coincide. Thus, the effects of the time spent in the active zones, of the circulation rate, of the apparatus dimensions, and of the pipings prove to be practically identical. For estimating the time required for steady conditions to establish, the unsteady problem is solved, and the solutions obtained are analyzed. The relation

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Circulation of irradiated materials ...

$t_{0.02} \approx 4/\lambda \approx 6T_{1/2}$ is obtained for an apparatus with "boiling beds" when the time spent by the irradiated material in the transport lines is neglected and continuous transport is assumed. $T_{1/2} = 0.693/\lambda$ is the half-life of the nuclei of irradiated material that have absorbed neutrons. For a loop with transport of portionated material, when the pipings are neglected, $t_{0.02} \approx 4/\lambda \approx 6T_{1/2}$ is obtained as a condition of attaining an activity which differs by less than 2% from that calculated with (3.9); the same condition, in other words, as applies to the loop with continuous material transport. There are 2 figures and 3 references: 1 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Institut fiziki AN Latv. SSR
(Institute of Physics AS Latviyskaya SSR)

SUBMITTED: December 24, 1960

Card 4/4

34624
S/186/62/004/001/003/008
E075/E436

21.7200 (also 1558)

AUTHORS: Roginskiy, S.Z., Todes, O.M.

TITLE: Physico-chemical features of the dynamic sorption of radioactive materials

PERIODICAL: Radiokhimiya, v.4, no.1, 1962, 39-44

TEXT: The authors consider the systems in which the irreversible adsorption of a radioactive species takes place, with the nuclear transformation products not being sorbed. In such cases, it is assumed that each occupied site of the adsorbent is freed when the transformation of the adsorbed atom takes place. As an example the chemisorption of radioactive Cl is considered, Cl being transformed into Ar which is almost completely retained in solution. A simplified analysis of the system showsthat in the first stages of sorption, space concentration of the radioactive Cl(C_0) decreases exponentially along the length of the column. Distance δ at which the concentration is halved is approximately $\delta = U/K$ where U is the space velocity of the gaseous stream and K is a value characterizing the rate of sorption and represents the reciprocal time of removal of the radioactive gas by the sorbent.

Card 1/3

Physico-chemical features ...

Ratio of concentration C_B of Cl in the gas leaving the column to initial concentration C_o is

$$\frac{C_B}{C_o} = \exp(-\frac{x}{\delta}) \cong \exp(-\frac{K\bar{x}}{U}) \quad (6)$$

where x is the full length of the adsorbent column. Since the rate of sorption is very high, width of the zone of concentration fall δ is many times smaller than length of the column x and consequently, C_B is many times smaller than C_o. In the second stage of the process a front of the adsorbate is formed and the expression for length of the active layer of the column is as follows:

$$L_m \cong \frac{v_o}{\lambda} \cong \frac{UC_o}{\lambda N_o} \quad (13)$$

where v_o is initial velocity of the front movement, λ [illegible] constant for the disintegration of Cl, and N_o is the maximum quantity of gas which can be retained by a unit volume of the

Card 2/3

column. When the front of the adsorbate ceases to move the final distribution of Cl concentration is established in all the column. The part of the column from the initial section to $x = L_m$ is practically saturated and the concentration in the gaseous phase falls to $CL \simeq b_o$. Below this layer the concentration falls exponentially. Thus the final concentration of Cl in the eluent is approximately

$$\frac{C_B}{C_o} = \exp\left[-\frac{(x - L_m)}{\delta}\right] \qquad (15)$$

Therefore, for practically complete removal of radioactive gas, the length of the adsorbent column x should not exceed double length of the main operating length $x = 2L_m$. Conditions approximating those considered above may be encountered in the movement of air containing pure isotopic radioactive halogens through rocks and soil. There are 3 figures.

SUBMITTED: January 12, 1961

Card 3/3

TODES, O.M.

Comments on N.A.Fuks' methods of deducting the law governing the vertical distribution of particles suspended in a turbulent flow. Zhur.tekh. fiz. 32 no.2:258-259 F '62. (MIRA 15:2)
(Suspensions (Chemistry)) (Hydrodynamics)

TODERICIU, D.

Contributions to the history of Rumanian oil. Petrol si gaze 13 no.4:189-191 Ap '62.

S/053/62/076/001/004/004
B117/B101

AUTHORS: Todes, O. M., and Petrenko, I. I.

TITLE: New papers on molecular physics

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 1, 1962, 181 - 183

TEXT: The authors suggest a discussion of two papers worked out in their laboratory [Abstracter's note: not stated] for purposes of instruction. The first is entitled "Determination of the diffusion coefficient and of the free path of water vapor molecules contained in air" (Fig. 1). The droplet diameters measured with a counter microscope are entered in a diagram representing R^2 as a funtion of τ. The diffusion coefficient is calculated from the slope of the averaged straight line as follows:

$D = (\rho/2c_o)\left[-\Delta(R^2)/\Delta\tau\right]$, where ρ is the density of the liquid, and c_o is the equilibrium concentration of water vapor contained in air. It is recommended that measurements should be made at three different pressures: $p_o \approx 1$, 1/2, and 1/4 atm, which permits to check the fact that the diffusion coefficient is inversely proportional to pressure: Dp_o = const. With

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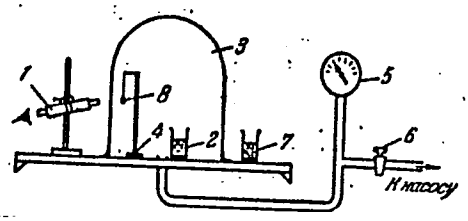
D measured and the average velocity of molecules $c = \sqrt{3RT/\mu}$ being known, the mean free path of vapor molecules contained in air at different pressures can be calculated from $D = 1/3\, lc$, for which about 1 hour is required. The second paper is entitled "Study of the dependence of viscosity of gas (air) on pressure, and determination of the free path of molecules" (Fig. 2). The qualitative analysis consists in the motion of a plate of thickness δ and of density ρ between two fixed surfaces being calculated. The equation for the motion of the plate is $du/dt = (2\eta/\rho\delta h)u$, where η is the viscosity of air, u is the velocity of the plate, h is the clearance between the fixed and the movable plate. η is inversely proportional to the number of vibrations z prior to the amplitude being diminished by $\sim 1/3$. During the evacuation of the flask, z is measured as to various pressures p. The free path at an atmospheric pressure p_o is calculated from the diagram showing the dependence of $1/z$ on p: $l_o = h(p_b/p_o)$, where p_b denotes the value of pressure at which the free path l is equal to h. Little more than one hour is required to carry out the measurements. The formation of mercury vapors in the laboratory can be avoided by using up-to-date devices (oil vapor pump, thermocouple vacuum gage) for gener-

ating and measuring the vacuum. There are 3 figures.

Fig. 1. Diagram of a device for measuring the diffusion coefficient of water vapor contained in air. Legend: (1) Counter microscope; (2) bulb containing concentrated H_2SO_4; (3) glass bell; (4) support with droplet suspension; (5) vacuum indicator; (6) tap to pump; (7) glass containing water and small glass rods; (8) suspended droplet.
Fig. 2. Diagram of a device for measuring the dependence of viscosity of air on pressure. Legend: (1) Glass cylinder; (2) turning device with movable plates; (3) fixed plates; (4) scale; (5) ЛТ-2 (LT-2) type measuring tube; (6) ВТ-2 (VT-2) type thermocouple vacuum gage; (7) ММ-40 (MM-40) oil vapor pump; (8) rough-vacuum flask; (9) forepump.

Fig. 1



Card 3/4 3

Fig 1

TUDES, O.M., dr. fiz.-mat. nauk, prof.; [illegible], kand. [illegible] nauk, dotsent.

Distribution of the solid phase [illegible] transportation with a continuous [illegible] no.1s18-[illegible] Ja '63 (MIRA 17:7)

ZISMAN, Girsh Abramovich; TODES, Oskar Moiseyevich; CHEBOTAREV, A.V., red.

[Course in general physics in 3 volumes] Kurs obshchei fiziki [v trekh tomakh]. Moskva, Nauka. Vol.1. Izd.3. 1964. 339 p. (MIRA 18:3)

ORYSHIN, A.M. (Saratov); TOLPA, O.M. (Saratov)

Determination of the conditions for combustion. PMTF no.1:68-75 Ja-F '65. (MIRA 18:8)

L 10600-67 EWT(m) IJP(c) DS/WW/JW

ACC NR: AP7003498 SOURCE CODE: UR/0069/66/028/004/0573/0579

AUTHOR: Todes, O. M. Fedoseyev, V. A.; Zubkov, V. I.

ORG: Odessa University im. I. I. Mechnikov (Odesskiy universitet)

TITLE: Calculation of the rate of vaporization and growth of a drop (spherule) with allowance for variation in its temperature

SOURCE: Kolloidnyy zhurnal, v. 28, no. 4, 1966, 573-579

TOPIC TAGS: vaporization, vapor

ABSTRACT: In calculating the rate of vaporization of a drop, allowance has to be made for the fact that the concentration of saturated vapor at the surface of the drop corresponds to the surface temperature rather than the given temperature of the surrounding environment. Since the saturated vapor concentration is exponentially dependent on the temperature, the calculation of the surface temperature and the rate of vaporization requires the preliminary solution of a complex transcendental equation. The present article shows that, given certain simplifying assumptions and the introduction of several dimensionless parameters, this problem can be reduced to a universal equation whose solution can be tabulated or represented in the

Card 1/2 UDC: 541.18:536.423.1

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ACC NR: AP7003498

form of a graph or nomogram. The same equation should also describe the process of drop growth in air and the process of vaporization or growth of a sublimable solid spherule. The vaporization and growth of a drop are considered both in the absence and in the presence of convection. In the first approximation the temperature drop between particle and flow is found to be independent of the rate of air-cooling. This conclusion and the calculated dependences were verified experimentally by measuring the rate of vaporization and cooling of vaporizing spherules and liquid drops of naphthalene. Orig. art. has: 4 figures, 18 formulas and 1 table.
[JPRS: 38,967]

SUB CODE: 20 / SUBM DATE: 29Mar65 / ORIG REF: 003

Card 2/2

ACC NR: AP6025524 SOURCE CODE: UR/0069/66/028/002/0268/0274

AUTHOR: Romanov, K. V.; Fedoseyev, V. A.; Todes, O. M.

ORG: Odessa University im. I. I. Mechnikov (Odesskiy universitet)

TITLE: Moisture buildup on droplets of a solution of a hygroscopic compound falling in an aqueous aerosol

SOURCE: Kolloidnyy zhurnal, v. 28, no. 2, 1966, 268-274

TOPIC TAGS: aerosol, moisture measurement, vapor condensation, coagulation, calcium chloride

ABSTRACT: Results of an investigation of condensational, coagulational, and total growth of droplets of solutions of hygroscopic compounds afford several tentative calculations of the buildup of moisture on droplets as they fall in a medium of aqueous aerosol, and evaluation of the effectiveness of the hygroscopic compound used, as well as elucidation of the optimal conditions at which this effectiveness is the greatest.

In the general case, the growth of the falling solution droplet must be held to be composite, that is, due to the action of both growth mechanisms -- condensation and coagulation. However, under different conditions, the relative importance of each of these two growth mechanisms varies sharply. For example, if aerosol droplets have a radius of the order of 10 microns,

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ACC NR: AP6025524

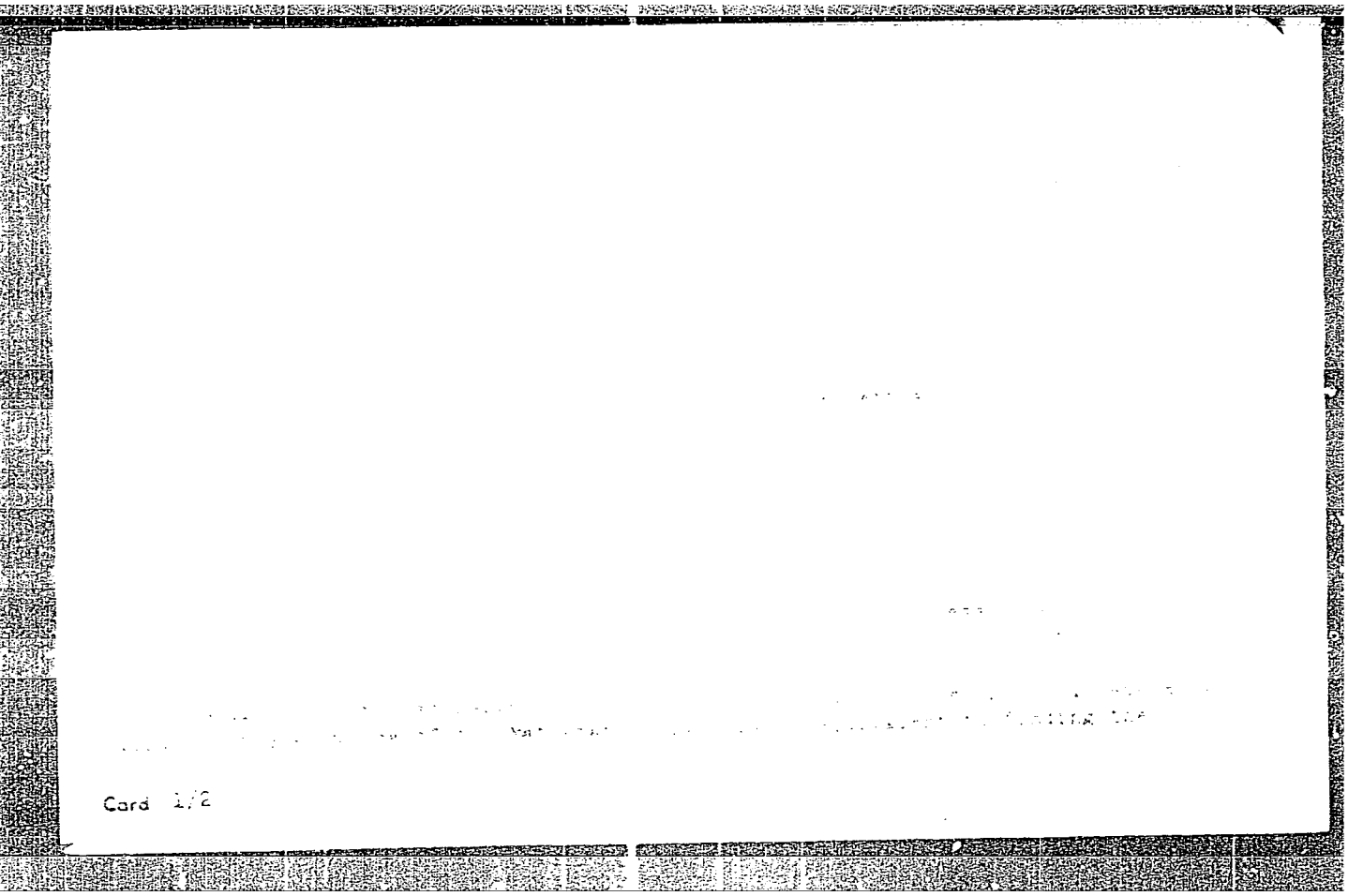
while the radius of the impinging droplet does not exceed 40 microns, the aerodynamic coefficient of capture is small (of the order of 10^{-2} - 10^{-1}), and coagulational buildup is negligibly small compared with condensational. A simplified method has been developed for calculating the moisture buildup on a droplet of a solution falling in an aqueous aerosol. By way of example, a calculation is given for droplets of a saturated solution of calcium chloride under various initial conditions. An analytical evaluation of optimal conditions for scrubbing moisture from an aqueous aerosol by solutions of hygroscopic agents is presented. Several conclusions of importance to practice are drawn relative to concentrations and initial radii of droplets of the solution used. Orig. art. has: 1 figure, 30 formulas and 1 table. [JPRS: 35,998]

SUB CODE: 07 / SUBM DATE: 03Nov64 / ORIG REF: 004

Card 2/2

ZISMAN, Girsh Abramovich; TODES, Oskar Movshevich; KUZNETSOVA, Ye.B., red.

[Course in general physics] Kurs obshchei fiziki. Moskva, Nauka. Vol.2. 1965. 366 p. (MIRA 18:5)



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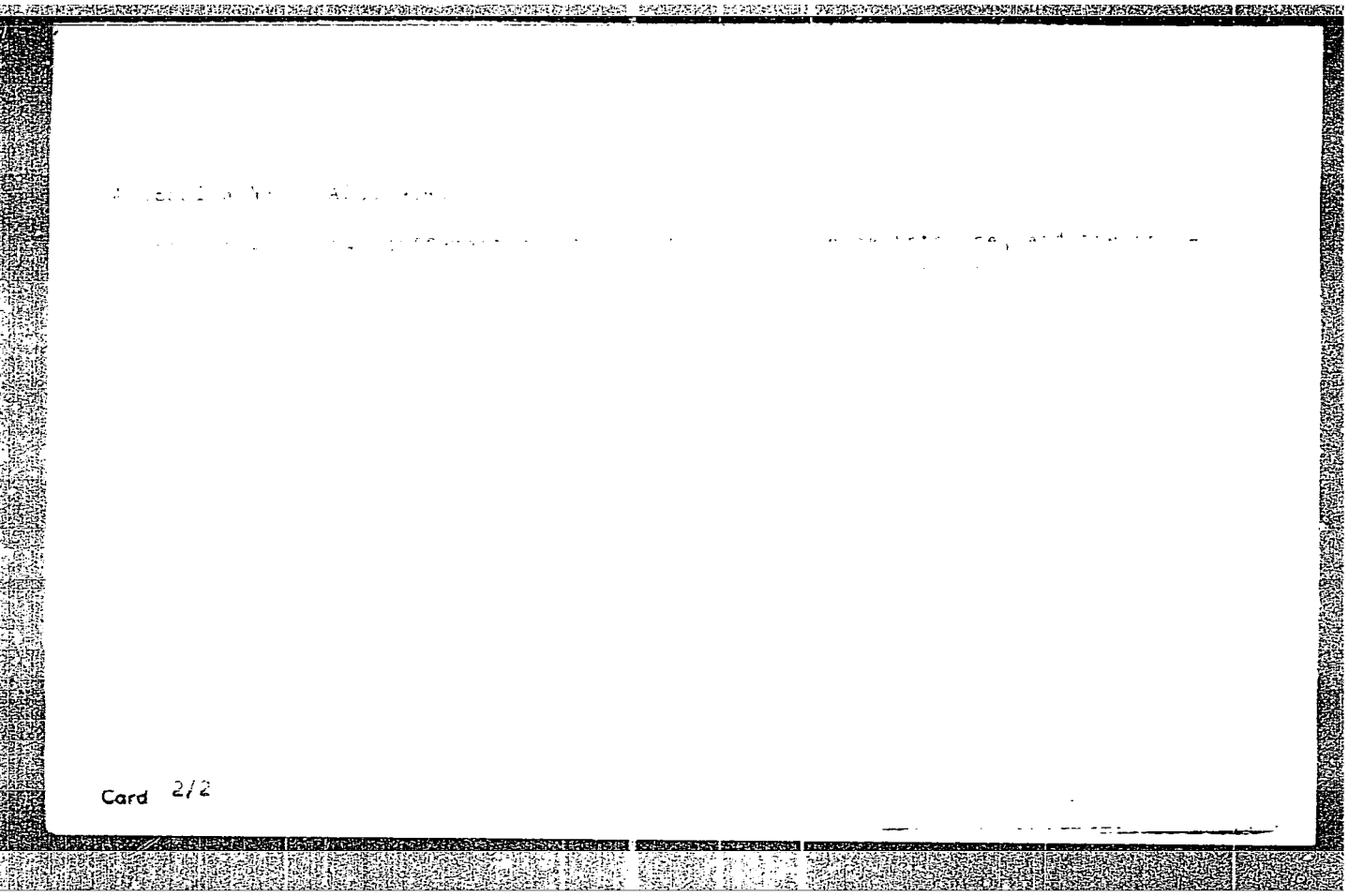

Card 2/2

RIZOV, Z.M.; TODES, O.M.; MAKAROVA, A.P.

Drying of a moist charge with hot and cold air. Inzh.-fiz. zhur. 6 no.9:10-17 S '63. (MIRA 16:8)

BONDAREVA, A.K.; GRIGOR'YEVA, V.I.; TODES, O.M.

Motion and mixing of solid particles in a fluidized bed. Dokl. AN SSSR 152 no.2:386-388 S '63. (MIRA 16:11)

1. Predstavleno akademikom S.I. Vol'fkovichem.

BREZHNEVA, N.Ye.; MARGOLIS, L.Ya.; TODES, O.M.; DOBYCHIN, D.P.; CHMUTOV, K.V.

Solomon IUl'evich Elovich. Zhur. fiz. khim. 35 no.5:1172-1173 My '61. (MIRA 16:7)

(Elovich, Solomon IUl'evich, 1898-1961)

GRISHIN, A.M.; TODES, O.M.

Thermal explosion in the case of heat transfer by convection and conduction. Dokl. AN SSSR 151 no.2:365-368 Jl '63. (MIRA 16:7)

1. Saratovskiy politekhnicheskiy institut. Predstavleno akademikom Ya.B.Zel'dovichem.
(Explosions) (Heat—Convection) (Heat—Conduction)

RIZOV, Z.M.; TODES, O.M.

Propagation of a heat wave due to the blowing of a gas through a bed of porous granular materials. Part 1. Inzh.-fiz. zhur. 6 no.5:70-74 My '63. (MIRA 16:5)
(Heat—Transmission) (Drying)

L 15741-63 EPF(c)/EPF(n)-2/ENT(1)/BDS AFFTC/ASD/IJP(C)/SSD

Pr-4/Pu-4 RM

ACCESSION NR: AR3002681 S/0124/63/000/005/B125/B125

68

SOURCE: Rzh. Mekhanika, Abs. 5B763

AUTHOR: Brounshteyn, B.I.; Todes, O. M.

TITLE: Calculation of the velocity pulsation and the coefficients of heat and mass transport for solid particles immersed in a turbulent current

CITED SOURCE: Tr. Odessk. un-ta. Ser. fiz. n., v. 152, no. 8, 1962, 85-90

TOPIC TAGS: motion equation, heat transfer, mass transport, turbulent current, particle, Reynolds number, turbulence, harmonic, Nusselt number, average

TRANSLATION: As a result of the approximate integration of the simplified equation of motion of solid particles in a current, the speed of which is varied according to a harmonic law, formulas for the calculation of the velocity pulsation of the particles for any Reynolds number are obtained. In calculating the averaged-over-a-period value of the Nusselt number, it is proposed to use the known dependence, under the assumption that the processes of thermal and mass transfer are quasi-stationary. Bibl. 9 names Yu. P. Gupalo

DATE ACQ: 14Jun63 SUB CODE: PH ENCL: 00

Card 1/1

ROZENBAUM, R.B.; TODES, O.M.

Theoretical analysis of the constrained fall of a sphere in a viscous liquid. Zap. LGI 36 no.3:16-27 '58. (MIRA 16:5)
(Gravity)

ACCESSION NR: AP3003558 S/0020/63/151/002/0365/0368

AUTHOR: Grishin, A. M.; Todes, O. M.

TITLE: Thermal explosion in the presence of heat transfer by convection and conduction

SOURCE: AN SSSR. Doklady, v. 151, no. 2, 1963, 365-368

TOPIC TAGS: criterion for self-ignition, heat conduction, heat convection, thermal explosion

ABSTRACT: A theoretical analysis was made to establish the accuracy and applicability of the following formula, previously derived by the author, as a criterion for thermal explosion on the assumption that heat removal takes place by convection only:

$$t_p \leqslant e^{\frac{q}{cT_0}\,\frac{E}{RT_0}}\, t_e, \qquad (1)$$

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where t_p is the time required to complete combustion at a constant combustion rate and initial temperature, t_e is the time required for thermal relaxation (cooling in the absence of combustion), E is activation energy, q is specific heat release per unit volume, c is specific heat, and T_o is initial temperature. Is is now shown that the formula can also be used as a criterion for self-ignition in vessels of arbitrary geometry when heat removal takes place by convection as well as by conduction. When applied to full and hollow cylinders and to a sphere, the formula yielded results which deviated only 2—3% from the exact solution obtained by Frank-Kamenetskiy. Term t_e is determined by the equation

$$\alpha \nabla^2 f + \frac{1}{t_e} f = 0, \qquad (2)$$

where α is the heat transfer coefficient, and f is a function defined by the equation for the regular cooling regime

$$T - T_o = C_1 f_1(x, y, z)\exp(-t/t_e).$$

ACCESSION NR: AP3003558

Formula (1) considerably simplifies the determination of the critical conditions for self-ignition in the presence of conduction and convection since it is not necessary to obtain the exact solution of the nonlinear equation. In some cases it is also possible to determine t_e by experiments on models with nonreactive substances having geometrical and thermal parameters similar to those of the actual system. The accuracy obtainable by this method was also established for the cases in which the Biot number is much larger or much smaller than 1. The article was presented by Academician Ya. B. Zel'dovich, 14 February 1963. Orig. art. has: 33 formulas.

ASSOCIATION: Saratovskiy politekhnicheskiy institut (Saratov Polytechnical Institute)

SUBMITTED: 30Jan63 DATE ACQ: 30Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 006 OTHER: 000

Card 3/3

TODESAS, D., inzhener-arkhitektor.

New system of pens in swine-fattening barns. Sel'.stroi.11[i.e.12] no.1:25-26 Ja '57. (MLRA 10:3)
(Swine houses and equipment)

1. TODESON, T.

2. USSR (600)

4. Radio - Receivers and Reception

7. Supplying the "ARZ-52" receivers from a 220 volt network. Radio No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

TODHE, Pandi, dr.

Acute primary myocarditis in children. Shendet. pop. 1:15-19 '64.

1. Shef i repartit te pediatrise — Shkoder.

TODIC, Radomir

Proposal of a method of the statistical control of labor productivity and the possibilities of its increase in the leather industry. Produktivnost 3 no.9:551-554 S '61.

1. Savezna industrijska komora, Sekcija za kozu, Beograd.

CRISAN, I.; BRATU, I.; DRUGARIN, C.; BRATU, N.; TODICA, P.

Partial results of the agrochemical classification of Banat soils. Studii agr Timisoara 10 no. 2: 241-256 Jl-D '63.

TITLE: An empirical relation for [illegible] residual gases in [illegible]

TOPIC TAGS: combustion product, internal combustion engine, thermodynamics

ABSTRACT: (Author's English [illegible] derive[illegible] a mathematic[illegible]

TODICESCU, Alexandru, ing.

An experimental relation for estimaing the temperature of burned residual gases in motors with four self-ignition units. Constr mas 16 no.9:478-480 S '64.

VERINA, V.N.; LUNGU, R.I.; MIRSKIY, D.A.; RADUL, M.M.; RUSANOVSKIY, V.G.; TODIKA, M.P.; PODRUKHINA, V., red.; KURMAYEVA, T., tekhn. red.

[Geography of the Moldavian S.S.R.]Geografiia Moldavskoi SSR; uchebnoe posobie dlia VIII klassa. Kishinev, Gos.izd-vo "Kartia moldoveniaske," 1962. 112 p. (MIRA 15:11)
(Moldavia--Geography)

TODIKA, M. P.

Economy of the right bank of the lower Dniester Valley between 1918 and 1940. Uch. zap. Tir. gos. ped. inst. no.9:55-64 '60. (MIRA 16:1)

(Dniester Valley--Economic policy)

Todika, M. P.

Translation from: Referativnyy zhurnal, Geografiya, 1957, Nr 6, p 166 (USSR) 14-57-6-12991

AUTHOR: Todika, M. P.

TITLE: Economic and Geographical Description of Lower Dnestr Region in the Prerevolutionary Period /Ekonomo-geograficheskiy ocherk Nizhnego Pridnestrov'ya. (Dooktyabr'skiy period)/

PERIODICAL: Uch. zap. Tirasopol'sk. ped. in-t, 1956, Nr 1, pp 41-57

ABSTRACT: A historical and geographical Description of lower Dnestr Region in the Moldavian SSR.

Card 1/1

MINDOV, Iv., inzh.; TODINOV, [illegible], inzh.

Economic aspects of the inner transport in the 6 Septemvri Elektrotransportniiat Zavod of Sofia. Mashinostroene 12 no.7: 9-12 Jl '63.

TODIRASCU, L

Forsterite bricks for clinker furnaces. p. 2

CONSTRUCTORUL, Bucureşti, Vol 8, No. 315, Jan, 1956

SO: East European Accessions List (EEAL) Library of Congress, Vol 5, No. 7, July 1956

TODIRASCU, L.

TODIRASCU, L. Is it advantageous to cool furnaces with water? p. 1.

Vol. 8, no. 361, Dec. 1956
CONSTRUCTORUL
TECHNOLOGY
RUMANIA

So: East European Accession, Vol. 6, No. 5, May 1957

TODIRASCU, Lucian, ing.

The Turda and Fieni Cement Works. Constr Buc 14 no. 675: 1,2 15 December 1962.